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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,459	05/11/2005	Hiroshi Kurakata	4918-0102PUS1	6940
2292 7590 01/15/2009 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER				
EOFF, ANCA				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
01/15/2009		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/534,459

Applicant(s)

KURAKATA, HIROSHI

Examiner

ANCA EOFF

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5, 6 and 8-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6 and 8-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date 10/06/2008
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. Claims 1-3, 5-6 and 8-24 are pending in the application. Claims 4 and 7 have been canceled.
2. The foreign priority document JP 2002-347224, filed on November 29, 2002 was received and acknowledged. However, in order to benefit of the earlier filing date, a certified English translation is required.

Claim Objections

3. Claim 13 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claim to place the claim in proper dependent form, or rewrite the claim in independent form.

Claim 13 depends on claim 10 and comprises only limitations that were included already in claim 10.

Claim Rejections - 35 USC § 102 and 35 USC § 103

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 8-9 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Akaiwa et al. (US Patent 5,721,990).

Claim 8 is a "product-by-process" claims. Even though the claims are directed to a process, the patentability is given by the product itself.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (MPEP 2113)

With regard to claims 8-9, Akaiwa et al. disclose an image forming apparatus comprising a transparent pattern area (column 3, line 32), which is formed by a transparent resist (column 3, lines 51-52).

The transparent pattern area of Akaiwa et al. is identical or, in the alternative, renders obvious the transparent resin pattern film of the instant application.

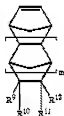
Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

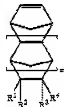
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 5-6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. (US Patent 6,451,499) in view of Tsunogae et al. (WO 00/73366, wherein the citations are from the English equivalent document US Patent 6,486,264) and in further view of Imai et al. (US Pg-Pub 2002/0012880).

With regard to claims 1-3 and 5-6, Jayaraman et al. disclose a polymer used for negative and positive photoresist compositions (abstract), wherein the polymer may comprise units of monomers of formulas (I) and (II) (column 3, lines 21-23):



(I) (monomer of formula (III) in column 8, lines 55-65),

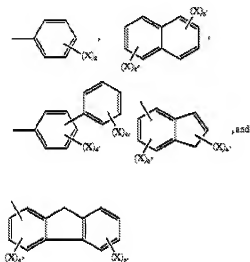


(II) (monomer of formula (I) in column 3, lines 30-40).

For the monomer of formula (I) above, m is preferably 0 or 1 (column 9, lines 8-9) and R^9 to R^{12} comprise groups of formula $-C(O)OR''$ (column 8, line 66-column 9, line 7), wherein R'' may be a hydrogen atom (column 10, lines 20-21).

The monomer of formula (I), which comprises groups C(O)ORⁿ, wherein Rⁿ is a hydrogen atom is equivalent to the alicyclic olefin monomer with an acidic group of claims 1-3 of the instant application.

For the monomer of formula (II) above, at least one of R¹ to R⁴ comprises a group selected from:



(column 3, line 50-column 4, line 10), wherein X may be an -OR¹⁴ group (column 4, line 1) and R¹⁴ may be a linear or branched C₁₋₁₀ alkyl group (column 4, lines 13-14).

In such a case, the monomer of formula (I) is equivalent to the alicyclic olefin monomer of claim 6 in which a group having an aromatic group and an ether group (aprotic polar group) are bonded.

While Jayaraman et al. do not specifically disclose a copolymer comprising a monomer (I) with carboxylic acid group and a monomer (II) comprising an aromatic group and an ether group, it would have been obvious to one of ordinary skill in the art to obtain such a polymer, based on Jayaraman's teaching that a monomer (I) and a monomer (II) may form a copolymer (column 3, lines 21-24) and the descriptions of

monomers (I) (column 8, line 55-column 10, line 21) and (II) (column 3, line 30-column 4, line 28).

Jayaraman et al. further disclose that the polycycloolefin monomers may polymerize in a process including a ring-opening metathesis polymerization (ROMP) followed by hydrogenation (column 11, lines 20-23).

Jayaraman et al. further disclose a ruthenium-containing organic compound used as a catalyst used in the ring-opening polymerization is (column 12, lines 42-43) but fail to disclose the organoruthenium catalyst of the instant application.

Tsunogae et al. disclose a process for producing hydrogenated ring-opening polymerization polymers of cycloolefins, wherein a polymer is prepared by ring-opening polymerization in the presence of an organoruthenium polymerization catalyst followed by a hydrogenation step (abstract).

The process of Tsunogae et al. is applied for the polymerization of cyclic olefins, such as tetracyclododecenes, norbornenes (column 3, line 14, column 4, lines 8-10).

One specific example of organoruthenium catalyst of Tsunogae et al. is bis (1,3-diisopropylimidazolidin-2-ylidene)benzylideneruthenium dichloride, in which two heteroatom-containing carbene compound is present (column 8, lines 48-54).

The organoruthenium catalysts of Tsunogae et al. show higher activity for the ring-opening polymerization (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the catalyst of Tsunogae et al. for the ring-opening

polymerization of Jayaraman et al., in order to take advantage of the higher activity of the catalyst for the ring-opening polymerization.

The bis (1,3-diisoproylimidazolidin-2-ylidene)benzylideneruthenium dichloride of Jayman modified by Tsunogae is equivalent to the organoruthenium compound of claims 1 and 5.

Jayaraman et al. further disclose that the polymer may be used in positive resist compositions, together with a solvent and a photoacid generator (column 17, line 65-column 18, line 3).

However, Jayaraman and Tsunogae fail to teach that a crosslinking compound may be used in the positive resist composition.

Imai et al. disclose a positive sensitive resin composition comprising a base polymer, an ether bond-containing unsaturated compound and an acid-generating agent, wherein the base polymer may comprise carboxylic acid groups (abstract).

Imai et al. further disclose that a positive resist composition may be subjected to a process comprising the steps of:

- heating the film on which the positive photosensitive composition has been applied so carboxyl groups of the resin and vinyl ether groups form a crosslink which is insoluble to a developing solution;

- irradiating with an active energy beam and, as necessary, heating the film so an acid generated in the irradiated area acts as catalyst to cleave the crosslink structure and to make the irradiated area soluble to a developer (par.0008).

Based on the fact that the polymer/resin with carboxylic groups of Jayaraman modified by Tsunogae may form a positive resist, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the ether bond-containing unsaturated compound of Imai et al. as crosslinker in the positive resist composition of Jayaraman modified by Tsunogae, with a reasonable expectation of success.

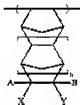
Imai et al. teach that heating may be conducted to initiate a crosslinking reaction between the resin and the ether-bond containing unsaturated compound (par.0133) so the ether-bond containing compound is equivalent to the crosslinker with vinyl groups of the instant application, as disclosed on page 23, lines 7-14 of the specification.

With regard to claim 16, Jayaraman et al. further teach that the photoacid generator may be an onium salt or a naphthoquinone-4-diazide (column 19, lines 21-27), which is known in the art at a compound capable of generating a positive pattern.

9. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. (US Patent 6,451,499) in view of Tsunogae et al. (WO 00/73366, wherein the citations are from the English equivalent document US Patent 6,486,264) and Imai et al. (US Pg-Pub 2002/0012880) as applied to claim 16 and in further view of Suwa et al. (US Patent 6,692,887).

With regard to claims 17-19, Jayaraman modified by Tsunogae and Imai teach the resist of claim 16 (see paragraph 8 above), wherein the photoacid generator may be an onium salt or a naphthoquinone-4-diazide (column 19, lines 21-27) but fail to teach the acid-generating agent of the instant application.

Suwa et al. disclose a radiation-sensitive resin compositions comprising a resin with an alicyclic skeleton in the backbone (abstract), such as the alicyclic skeleton of formula (III):



(III) (formula (2) in column 3, lines 55-60).

The resin may be obtained by a ring-opening polymerization followed by an addition reaction, such as hydrogenation (column 14, lines 1-0).

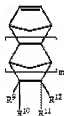
Suwa et al. further disclose that the radiation-sensitive resin may comprise a photoacid generating agent, such as onium salts, halogen-containing compound and diazoketone compounds (column 19, lines 21-23). A specific examples of diazoketone compound is the 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydroxybenzophenone (column 20, lines 4-5).

As Suwa et al. shows that that the 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydrobenzophenone is functionally equivalent to onium salts as photoacid generating compound in radiation sensitive composition comprising resin obtained by ring-opening polymerization of alicyclic olefins followed by hydrogenation, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydrobenzophenone of Suwa et al. in the resist composition of Jayaraman modified by Tsunogae and Imai, with a reasonable expectation of success.

The 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydrobenzophenone is equivalent to the quinonediazidesulfonic acid ester obtained from ,2-naphthoquinonedizide-5-sulfonic acid chloride and 2,3,4,4'-tetrahydroxybenzophenone of the instant application.

10. Claims 10-15, 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. (US Patent 6,451,499) in view of Tsunogae et al. (WO 00/73366, wherein the citations are from the English equivalent document US Patent 6,486,264) and in further view of Imai et al. (US Pg-Pub 2002/0012880) and Eilbeck (US Patent 6,790,582).

With regard to claims 10- 15 and 24 , Jayaraman et al. disclose a polymer used for negative and positive photoresist compositions (abstract), wherein the polymer may comprise units of monomers of formulas (I) and (II) (column 3, lines 21-23):

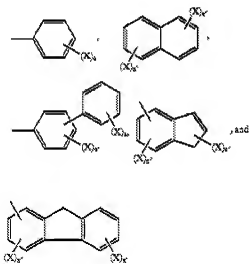


(II) (monomer of formula (I) in column 3, lines 30-40).

For the monomer of formula (I) above, m is preferably 0 or 1 (column 9, lines 8-9) and R^9 to R^{12} comprise groups of formula $-C(O)OR''$ (column 8, line 66-column 9, line 7), wherein R'' may be a hydrogen atom (column 10, lines 20-21).

The monomer of formula (I), which comprises groups $C(O)OR''$, wherein R'' is a hydrogen atom is equivalent to the alicyclic olefin monomer with an acidic group of claims 10-12 of the instant application.

For the monomer of formula (II) above, at least one of R^1 to R^4 comprises a group selected from:



(column 3, line 50-column 4, line 10), wherein X may be an $-OR^{14}$ group (column 4, line 1) and R^{14} may be a linear or branched C_{1-10} alkyl group (column 4, lines 13-14).

In such a case, the monomer of formula (II) is equivalent to the alicyclic olefin monomer of claim 15 in which a group having an aromatic group and an ether (aprotic polar group) are bonded.

While Jayaraman et al. do not specifically disclose a copolymer comprising a monomer (I) with carboxylic acid group and a monomer (II) comprising an aromatic group and an ether group, it would have been obvious to one of ordinary skill in the art to obtain such a polymer, based on Jayaraman's teaching that a monomer (I) and a monomer (II) may form a copolymer (column 3, lines 22-24) and the descriptions of monomers (I) (column 8, line 55 – column 19, line 21) and (II) (column 3, line 30-column 4, line 28).

Jayaraman et al. further disclose that the polycycloolefin monomers may polymerize in a process including a ring-opening metathesis polymerization (ROMP) followed by hydrogenation (column 11, lines 20-23).

Jayaraman et al. further disclose a ruthenium-containing organic compound used as a catalyst used in the ring-opening polymerization is (column 12, lines 42-43) but fail to disclose the organoruthenium catalyst of the instant application.

Tsunogae et al. disclose a process for producing hydrogenated ring-opening polymerization polymers of cycloolefins, wherein a polymer is prepared by ring-opening polymerization in the presence of an organoruthenium polymerization catalyst followed by a hydrogenation step (abstract).

The process of Tsunogae et al. is applied for the polymerization of cyclic olefins, such as tetracyclododecenes, norbornenes (column 3, line 14, column 4, lines 8-10).

One specific example of organoruthenium catalyst of Tsunogae et al. is bis (1,3-diisopropylimidazolidin-2-ylidene)benzylideneruthenium dichloride, in which two heteroatom-containing carbene compound is present (column 8, lines 48-54).

The organoruthenium catalysts of Tsunogae et al. show higher activity for the ring-opening polymerization (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the catalyst of Tsunogae et al. for the ring-opening polymerization of Jayaraman et al., in order to take advantage of the higher activity for the ring-opening polymerization.

The bis (1,3-diisopropylimidazolidin-2-ylidene)benzylideneruthenium dichloride of Jayaraman modified by Tsunogae is equivalent to the organoruthenium compound of claims 10, 13 and 14.

Jayaraman et al. further disclose that the polymer may be used in positive resist compositions, together with a solvent and a photoacid generator (column 17, line 65-column 18, line 3).

However, Jayaraman and Tsunogae fail to teach that a crosslinking compound may be used in the positive resist composition.

Imai et al. disclose a positive sensitive resin composition comprising a base polymer, an ether bond-containing unsaturated compound and an acid-generating agent, wherein the base polymer may comprise carboxylic acid groups (abstract).

Imai et al. further disclose that a positive resist composition may be subjected to a process comprising the steps of:

- heating the film on which the positive photosensitive composition has been applied so carboxyl groups of the resin and vinyl ether groups form a crosslink which is insoluble to a developing solution;

- irradiating with an active energy beam and, as necessary, heating the film so an acid generated in the irradiated area acts as catalyst to cleave the crosslink structure and to make the irradiated area soluble to a developer (par.0008).

Based on the fact that the polymer/resin with carboxylic groups of Jayaraman modified by Tsunogae may form a positive resist, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the ether bond-containing unsaturated compound of Imai et al. as crosslinker in the positive resist composition of Jayaraman modified by Tsunogae, with a reasonable expectation of success.

Imai et al. teach that heating may be conducted to initiate a crosslinking reaction between the resin and the ether-bond containing unsaturated compound (par.0133) so the ether-bond containing compound is equivalent to the crosslinker of the instant application, as taught on page 23, lines 7-14 of the specification.

Jayaraman et al. further disclose that a resist composition is subjected to a process comprising the steps of:

- a) coating the substrate with a film of the positive resist composition;
- b) imagewise exposing the film to radiation;
- c) developing the image (column 19, line 66-column 20, line 3).

Jayaraman, Tsunogae and Imai fail to disclose a post-baking step performed after the development of the resist.

However, a step of post-development heat treatment is well-known in the art as being performed in a lithographic process in order to increase the pattern adhesion, as evidenced by Eilbeck in column 12, lines 45-46.

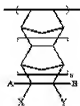
Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the post-development heat treatment /post-baking of the pattern of Jayaraman modified by Tsunogae and Imai.

With regard to claim 20, Jayaraman et al. further teach that the photoacid generator may be an onium salt or a naphthoquinone-4-diazide (column 19, lines 21-27), which is known in the art at a compound capable of generating a positive pattern.

11. Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jayaraman et al. (US Patent 6,451,499) in view of Tsunogae et al. (WO 00/73366, wherein the citations are from the English equivalent document US Patent 6,486,264), Imai et al. (US Pg-Pub 2002/0012880) and Eilbeck (US patent 6,790,582) as applied to claim 20 above and in further view of Suwa et al. (US Patent 6,692,887).

With regard to claims 21-23, Jayaraman modified by Tsunogae, Imai and Eilbeck teach the process of claim 20 (see paragraph 10 above), wherein the photoacid generator may be an onium salt or a naphthoquinone-4-diazide (column 19, lines 21-27) but fail to teach the acid-generating agent of the instant application.

Suwa et al. disclose a radiation-sensitive resin compositions comprising a resin with an alicyclic skeleton in the backbone (abstract), such as the alicyclic skeleton of formula (III):



(III) (formula (2) in column 3, lines 55-60).

The resin may be obtained by a ring-opening polymerization followed by an addition reaction, such as hydrogenation (column 14, lines 1-0).

Suwa et al. further disclose that the radiation-sensitive resin may comprise a photoacid generating agent, such as onium salts, halogen-containing compound and diazoketone compounds (column 19, lines 21-23). A specific examples of diazoketone compound is the 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydroxybenzophenone (column 20, lines 4-5).

As Suwa et al. shows that that the 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydrobenzophenone is functionally equivalent to onium salts as photoacid generating compound in radiation sensitive composition comprising resin obtained by ring-opening polymerization of alicyclic olefins followed by hydrogenation, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydrobenzophenone of Suwa et al. in the resist composition of Jayaraman modified by Tsunogae, Imai and Ellbeck.

The 1,2-naphthoquinonedizide-5-sulfonic acid ester of 2,3,4,4'-tetrahydrobenzophenone is equivalent to the quinonediazidesulfonic acid ester obtained from 1,2-naphthoquinonedizide-5-sulfonic acid chloride and 2,3,4,4'-tetrahydroxybenzophenone of the instant application.

Response to Arguments

12. Applicant's arguments filed on October 06, 2008, with respect to the rejection of claims 1-3, 8-12 and 16-24 under 35 USC 103(a) over Suwa et al. (US patent 6,692,887) in view of Yasunami et al. (US Patent 6,696,219) has been fully considered and are found persuasive.

Also, the rejection of claim 15 under 35 USC 103(a) over Suwa et al. (US Patent 6,692,887) in view of Yasunami et al. (US Patent 6,696,219) as applied to claim 10 and in further view of Jayamaran et al. (US Patent 6,147,177) has been fully considered and is found persuasive.

-The rejection of claims 5-6 and 13-14 under 35 USC 103(a) over Suwa et al. (US patent 6,692,887) in view of Yasunami et al. (US Patent 6,696,219) as applied to claims 1 and 10 and in further view of Tsunogae et al. (US patent 6,486,264) have been fully considered and are persuasive.

Therefore all of above-mentioned rejections have been withdrawn.

However, upon further consideration, new grounds of rejection are shown in paragraphs 4-11 of the Office Action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANCA EOFF whose telephone number is (571)272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. E./
Examiner, Art Unit 1795

/Cynthia H Kelly/
Supervisory Patent Examiner, Art Unit 1795